# CONTENTS.


PAGE

Election of Office-Bearers, Session 1897–98, . . . . . 1

Chairman's Opening Address. By the Right Hon. Lord Kelvin, *President*, . . . . . 2

A Short Note on the Disturbance of the Magnetical and Meteorological Instruments at the Colaba Observatory during the Earthquake of 12th June 1897. By N. A. Moos, Director of the Observatory, . . . . . 11

On the Velocity of Graded Actions. By James Walker, Ph.D., D.Sc., University College, Dundee, . . . . . 22

Preliminary Note on a Characteristic of Certain Chemical Reactions. By Professor John Gibson, Ph.D., . . . . . 33

Leakage from Electrified Metal Plates and Points placed above and below Uninsulated Flames. By the Right Hon. Lord Kelvin, G.C.V.O., F.R.S., and Dr Magnus Maclean, . . . . 38

Observations on the Migratory Movements of Salmonidæ during the Spawning Season. By W. L. Calderwood, . . . . . 47

Note on the Action of Hydroxylamine Hydrochlorate. By W. Brodie Brodie, M.B., C.M., Physiological Laboratory, University, Glasgow. (*Communicated by* Professor M'Kendrick), . . 56

Notes on some Additional Fossils collected at Seymour Island, Graham's Land, by Dr Donald and Captain Larsen. By George Sharman, Esq., and E. T. Newton, F.R.S. (*Communicated by* Sir Archibald Geikie, F.R.S.) (With a Plate), . . . . 58

Note on the Axes of Symmetry which are Crystallographically possible. By Hugh Marshall, D.Sc., . . . . . 62

Notes on some Specimens of Rocks from the Antarctic Regions, by Sir Archibald Geikie, F.R.S. With Petrographical Notes, by J. J. H. Teall, F.R.S., . . . . . 66

Observations on the Theories of Vowel Sounds. By John G. M'Kendrick, Professor of Physiology in the University of Glasgow, . . . . . 71

On the Derivation of the Curves of Vowel Sounds by means of Microscopical Research of their Phonograms. By J. D. Boeke, Alkmaar, Holland. (*Presented by* Professor M'Kendrick), . 88

On the Fourierian Analysis of Phonographic Tracings of Vowels. By R. J. Lloyd, Doc. Lit., etc., Liverpool, . . . . . 97

On the Thermodynamics of Volta-contact Electricity. By the Right Hon. Lord Kelvin, G.C.V.O., etc., . . . . . 118

PAGE

On Thermodynamics founded on Motivity and Energy. By the Right Hon. Lord Kelvin, G.C.V.O., F.R.S., F.R.S.E., etc., . 126

On Electric Equilibrium between Uranium and an Insulated Metal in its Neighbourhood. By the Right Hon. Lord Kelvin, G.C.V.O., *P*.R.S.E., etc.; J. Carruthers Beattie, D.Sc., F.R.S.E.; and M. Smoluchowski de Smolan, Ph.D., . . . . . 131

A Relation between Permanents and Determinants. By Thomas Muir, LL.D., . . . . . 134

Heat of Combination of Metals in the Formation of Alloys. By Alexander Galt, D.Sc., . . . . . 137

A Problem of Sylvester's in Elimination. By E. J. Nanson, M.A. (*Communicated by* Professor Chrystal), . . . . . 150

On the Ellipse-Glissette Elimination Problem. By E. J. Nanson. (*Communicated by* Professor Chrystal), . . . . . 158

On the Directions which are most altered by a Homogeneous Strain. By Professor Tait. (With a Plate), . . . . . 162

On the Generalization of Josephus' Problem. By Professor Tait, . 165

On the Nature of "Palladium Hydrogen." By John Shields, D.Sc., Ph.D., Davy-Faraday Laboratory, Royal Institution, London, . 169

Some Contributions to the Spectroscopy of Hæmoglobin and its Derivatives. By David Fraser Harris, M.D., C.M., B.Sc. (Lond.), "Muirhead" Demonstrator of Physiology in the University of Glasgow, . . . . . 187

Note on the Effect of Mixed Diet as Regards Salivary Digestion. By W. G. Aitchison-Robertson, M.D., D.Sc., F.R.C.P.E., . . 209

On Torsional Oscillations of Wires. By Dr W. Peddie, . . 212

The Strains produced in Iron, Steel, Nickel, and Cobalt Tubes in the Magnetic Field. Part II. By Professor C. G. Knott, D.Sc., F.R.S.E., . . . . . 216

On Consonant-Sounds. By R. J. Lloyd, D. Lit., M.A., Hon. Reader in Phonetics at the University College, Liverpool. (With a Plate), 219

Note on Crystalline Hydrates of Sodium Thiosulphate. By W. W. Taylor, M.A., B.Sc. (*Communicated by* Professor Crum Brown), . 248

The Freezing-Point of Aqueous Solutions of Sodium Mellitate. (*Preliminary Note.*) By W. W. Taylor, M.A., B.Sc. (*Communicated by* Professor Crum Brown), . . . . . 252

On the Electrolysis of Ethyl Potassium Diethoxysuccinate. By Professor Crum Brown and Dr H. W. Bolam, . . . 255

Note on the Passage of Water and other Substances through India-rubber Films. By R. A. Lundie, M.A., M.B., B.Sc., F.R.C.S.Ed. (With a Plate), . . . . . 258

Note on Finding the Logarithmic Sines and Tangents of Small Arcs. By J. Burgess, C.I.E., LL.D., . . . . . 265

On the Theory of Archimeric Segmentation and its bearing upon the Phyletic Classification of the *Cœlomata*. By A. T. Masterman, D.Sc., . . . . . 270

PAGE

On a supposed Resemblance between the Marine Faunas of the Arctic and Antarctic Regions. By D'Arcy Wentworth Thompson, C.B., . . . . . 311

Note on Dew Bows. By C. G. Knott, D.Sc., and R. A. Lundie, M.A., B.Sc., M.B., C.M., . . . . . 350

On the Eliminant of a Set of Quadrics, Ternary or Quaternary. By E. J. Nanson. (*Communicated by* Professor Chrystal), . . 353

Note on the Compressibility of Solutions of Sugar. By Professor Tait, 359

Dust Figures of Electrostatic Lines of Force. By David Robertson, A.G.T.C. (*Communicated by* Professor Jamieson), . . . 361

On the Reflexion and Refraction of Solitary Plane Waves at a Plane Interface between two Isotropic Elastic Mediums—Fluid, Solid, or Ether. By Lord Kelvin, G.C.V.O., . . . . 366

Symmetrical Solution of the Ellipse-Glissette Elimination Problem. By the Hon. Lord M'Laren, . . . . . 379

The Action of Persulphates on Iodine. By Hugh Marshall, D.Sc., . . . . . 388

On some Oceanographic Problems. By Vice-Admiral S. Makaroff, Imperial Russian Navy. (Plates I. to XII.), . . . 391

On the Survey by the S.S. "Britannia" of the Cable Route between Bermuda, Turk's Islands, and Jamaica. By R. E. Peake, M.Inst. C.E. With Descriptions by Sir John Murray, K.C.B., F.R.S., of the Marine Deposits brought home. (*Communicated by* Sir John Murray. (With a Map), . . . . . 409

The Energy of the Röntgen Rays. By Rev. Alexander Moffat, M.A., B.Sc. (*Communicated by* Dr C. G. Knott), . . . 430

On Nernst's "Osmotic Experiment" and a Definition of Osmotic Pressure. By Professor Crum Brown, . . . . 439

Determination of the Sign of a Single Term of a Determinant. By Thomas Muir, LL.D., . . . . . 441

Tidal Currents of the North Sea. By Alexander Buchan, LL.D., F.R.S., . . . . . 478

On the Development and Morphology of the Marsupial Shoulder-Girdle. By R. Broom, M.D., B.Sc. (*Communicated by* Sir William Turner), . . . . . 482

Equilibrium between Sulphuric Acid and Sulphates in Aqueous Solution. By Sydney A. Kay, B.Sc. (*Communicated by* Professor Walker), . . . . . 484

Application of Sellmeier's Dynamical Theory to the Dark Lines $D_1$, $D_2$ produced by Sodium-Vapour. By Lord Kelvin, G.C.V.O., P.R.S.E., . . . . . 523

Note on Polarisation Phenomena observed in Quantitative Electrolytic Determinations. By Hugh Marshall, D.Sc., . . 532

The Multiplication of an Alternant by a Symmetric Function of the Variables. By Thomas Muir, LL.D., . . . . 539

Note on a Persymmetric Eliminant. By Thomas Muir, LL.D., . 543

PAGE

On the Linear and Vector Function. By Professor Tait, . . 547

Contributions to the Craniology of the People of the Empire of India. Part I.—The Hill-Tribes of the North-East Frontier and the People of Burma. By Professor Sir William Turner, D.C.L., F.R.S., . . . . . 550

Decorated and Sculptured Skulls from New Guinea. By Professor Sir William Turner, D.C.L., F.R.S. (Plates I.–VI.), . . 553

The Propagation of Earthquake Vibrations through the Earth. By Professor C. G. Knott, D.Sc., . . . . . 573

Magnetic Twist in Nickel Tubes. By Professor C. G. Knott, D.Sc., 586

The Hydrolysis of Thallic Sulphate. By Hugh Marshall, D.Sc., . 596

Note on Mr Joseph O. Thompson's Results regarding Vibrating Wires. By Dr W. Peddie, . . . . . 598

An Improved Form of Craniometer for the Segmentation of the Transverse, Vertical, and Antero-Posterior Diameters of the Cranium. By David Hepburn, M.D., C.M., Lecturer on Regional Anatomy in the University of Edinburgh. (With a Plate), . 601

Preliminary Note of Experiments showing Heat of Combination in the Formation of Alloys of Zinc and Copper to be Negative when the Proportion of Copper is less than about 30 per cent. By Alexander Galt, D.Sc., . . . . . 619

On Duplicitas Anterior in an Early Chick Embryo. By Thomas H. Bryce, M.A., M.B. (With Four Plates), . . . 622

Magnetism and Molecular Rotation. By Lord Kelvin, *P.*R.S.E., . 631

On the Restoration of Co-ordinated Movements after Nerve Section. By Robert Kennedy, M.A., D.Sc., M.D., Glasgow. (*Communicated by* Professor M'Kendrick), . . . . . 636

On the Anatomy of *Prosthecocotyle torulosa* (Linstow) and *Prosthecocotyle heteroclita* (Dies.). By Dr O. Fuhrmann, University of Geneva. (*Communicated by* Sir John Murray, K.C.B.) (With a Plate), . . . . . 641

On the Vascular System of the Hypocotyl and Embryo of *Ricinus communis*, L. By Edith Chick, B.Sc., Quain Student in Botany, University College, London. (With Three Plates), . . . 652

Changes that occur in some Cells of the Newt's Stomach during Digestion. By E. Wace Carlier, M.D., B.Sc., etc., Professor of Physiology, Mason University College, Birmingham. (With Five Plates), . . . . . 673

On some Remains of Scottish Early Post-Pliocene Mammals. By the Rev. Professor Duns. No. II., . . . . . 692

Meetings of the Royal Society—Session 1897–98, . . 701–711

Meetings of the Royal Society—Session 1898–99, . . 712–732

Donations to the Library, . . . . . 733–760

Obituary Notices, . . . . . i–vi

Index, . . . . . vii–xv

BRITISH
17 MY 1900